Zootaxa 2641: 55–61 (2010)
www.mapress.com/zootaxa/

Article

ISSN 1175-5326 (print edition)
ZOOTAXA
ISSN 1175-5334 (online edition)

A second known species of *Eratomyia* Amorim & Rindal (Diptera, Rangomaramidae, Chiletrichinae) from Colombia

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Abstract

A second species of the genus *Eratomyia* Amorim & Rindal —*E. risaralda*, **sp. n.**— is described from Risaralda, Colombia, based on one male and three females. The female of *Eratomyia* is described for the first time. A number of striking modifications in the female terminalia shared with *Chiletricha* Chandler support the hypothesis that they are sister genera within the Rangomaramidae. The position of *Chiletricha* and *Eratomyia* within the Chiletrichinae is discussed.

Key words: Systematics, Rangomaramidae, Chiletrichinae, Neotropical Region, biodiversity

Introduction

Four subfamilies are currently recognized for the Rangomaramidae, encompassing genera that for quite long had an uncertain position within the Mycetophiliformia (*sensu* Amorim & Rindal 2007 = Sciaroidea). The family was originally proposed for the single genus *Rangomarama* Jaschhof & Didham alone (Jaschhof & Didham 2002), with five species in New Zealand. Chandler (2002) demonstrated that *Heterotricha* Loew in its original composition was paraphyletic and transferred some of the species previously included in the genus and new related species to the genera *Chiletricha*, *Afrotricha* Chandler, *Kenyatricha* Chandler, *Nepaletricha* Chandler, *Anisotricha* Chandler, *Sciarosoma* Chandler and *Sciaropota* Chandler. More recently, *Insulatricha* Jaschhof (Jaschhof 2004a) and *Starkomyia* Jaschhof (Jaschhof 2004b) were described from New Zealand and *Madagotricha* Jaschhof & Jaschhof, from Madagascar (Jaschhof & Jaschhof 2008).

Hippa & Vilkamaa (2005, 2006a) performed a phylogenetic study of the higher Bibionomorpha and proposed *Rangomarama* to be a subfamily of Sciaridae. More recent papers added species to the genera *Rhynchoheterotricha* Freeman and *Nepaletricha*, accumulating morphological information to the knowledge of the family (Hippa & Vilkamaa 2006b, Hippa *et al.* 2009). Amorim & Rindal (2007) performed an extensive study of the Bibionomorpha phylogeny, including 63 terminal taxa and 137 characters. They concluded that *Rangomarama*, *Heterotricha*, the group of genera related to *Chiletricha*, and the group of genera around *Ohakunea* Tonnoir & Edwards compose a clade with four monophyletic units, each of which was ranked as subfamilies within the Rangomaramidae. The Ohakuneinae, besides *Ohakunea*, includes the genera *Colonomyia* Colless, *Rogambara* Jaschhof, and *Cabamofa* Jaschhof. The Chiletrichinae includes *Chiletricha*, *Eratomyia*, *Kenyatricha*, *Rhynchoheterotricha*, *Insulatricha*, and possibly *Anisotricha*, *Nepaletricha* and *Madagotricha*. The position of *Sciarosoma*, *Sciaropota*, *Freemanomyia* Jaschhof and *Starkomyia* may be part of the Rangomaramidae and not necessarily in the same clades, but it is still uncertain. *Afrotricha* most certainly belongs in the Sciaridae. In Jaschhof & Jaschhof's view (2008), *Heterotricha* composes a monophyletic group with the Chiletrichinae.

The genus *Eratomyia* was known to date from a single species, described by Amorim & Rindal (2007) based on a single male from Andean Ecuador. In their analysis, the genus came out as sister to *Chiletricha*,

Accepted by P. Kerr: 15 Sep. 2010; published: 11 Oct. 2010

within the Chiletrichinae. In this paper, we describe and illustrate an additional species of the genus from Colombia, at the northern extreme of the Andes, including the first known females in the genus. We also discuss the position of *Eratomyia* within the subfamily, considering the information brought up by this new species.

Material and methods

The material examined of the new species described here belongs to the Diptera collection of the Alexander von Humboldt Biological Resources Research Institute (IAvH, Bogota, Colombia). Head, thorax, wing, and terminalia were drawn after dissection, clearing and mounting on permanent slides. The terminalia were cleared in 10% KOH 40ºC for 4–6h and neutralized in acetic acid. The female terminalia were mounted on microscope slides with Canada balsam, while male terminalia were mounted on microscope slides with glycerin. Both were drawn at a magnification of 200X, with the aid of a microscope and *camera lucida*. Morphological terminology follows Amorim & Rindal (2007).

Eratomyia Amorim & Rindal 2007: 14.

Type-species: *Eratomyia magnifica* Amorim & Rindal 2007 (orig. des.).

Diagnosis. Mid pleural pit absent. Wing membrane without marcrotrichae. First sector of CuA (basal to insertion of m-cu) more than half the second sector of CuA; r-m as long as or longer than first sector of Rs; bM shorter than m-cu.

Eratomyia risaralda, sp. n.

(Figs. 1–4)

Diagnosis. Wing membrane with a light brown macula over the base of Rs and r-m, and another one over the base of the medial fork. Male abdominal tergite 3 yellow.

Material examined. Holotype, ♂, Colombia, Risaralda SFF, Otún Quimbaya, El Molinillo, 04º43'S 75º34'W, 2220 m17.ii–04.iii.2003, G. López leg. (types located in the IAvH). **Paratypes**. 3 ♀, same data as holotype (one female paratype in the MZUSP collection).

Description. Total body length, 3.4 mm. Wing length, 4.5 mm.

Male. Head. Scape and pedicel dark yellow, flagellum light brown, 14 flagellomeres; first flagellomere more than 1.5 longer second flagellomere, dark yellow at the very base; flagellomeres much longer than wide, with scattered setulae, decreasing in length to apex, last flagellomere digitiform. Three ocelli close together, middle ocellus smaller than lateral ocelli, occiput dark brown. Frons light brown, with few setulae; face and clypeus yellow. Palpus with palpiger bare and four light yellow, setose palpomeres, gradually longer to the apex. Labella yellow. **Thorax**. Scutum and scutellum shining blackish brown. Two rows of longer dorsocentral setae, next to an irregular row laterally, entirely bare over the remaining scutum; a single, irregular row of scutellar setae. Pleural sclerites shining dark brown, except katepisternum, with a silvery pruinose band; proepisternum with few setae, no antepronotal setae and a single seta on postpronotum, basisternite with a group of anterior setae. Mesepimeron and metepisternum with a group of setae, laterotergite and mediotergite bare. Halter dark yellow. **Legs**. Coxae mostly yellow, mid coxa with brown elongate meron, hind coxa brown at proximal margin, trochanteres yellow with brownish areas, femora yellow, hind femur brownish at base and at apex, tibiae ochre-brown, brown to apex, tarsi brown, dark brown to apex. Tibial spurs 1-2-2, spurs brown, length about 1.5 x apex of tibiae. **Wing** (Fig. 1). Membrane with a brownish macula on the first sector of Rs and at base of medial fork; Wing membrane with microtrichiae present, and macrotrichia absent, setae on all veins except CuP and A_1. Sc long, but incomplete, reaching

basal third of wing. R_1 long, reaching C beyond distal third. R_5 reaching C just before wing apex, running quite apart from R_1; r-m slightly shorter than first sector of Rs. Basal cell wide; bM about twice r-m, almost longitudinal; m-cu slightly longer than bM; first sector of CuA more than half length of second sector of CuA; CuP well sclerotized; A_1 incomplete, weakly sclerotized, close to CuP (not actually perceptible in Fig. 1); anal lobe reduced. **Abdomen**. Tergites dark shining brown, except tergite 3, yellow; sternites light brown in the middle, yellowish to the lateral margins, except for sternite 3, entirely yellow. Tergites wider than sternites. **Terminalia.** (Figs. 2–3). Terminalia yellow, except for the brown inner projection of gonocoxites and distal projection of tergite 9. A posterior incision on the syngonocoxite, sternite 9 not visible as an independent plate; each gonocoxite with a distal digitiform projection more sclerotized than the rest of the terminalia, bearing some strong spines, a short digitiform projection with setae behind each of these stronger gonocoxite projections; gonostyle clavate, base much wider than apex; aedeagus wide, blunt at apex; tergite 9 with a pair of wide distal, more strongly sclerotized projections, with a number of elongated black spines; cercus visible, lobate.

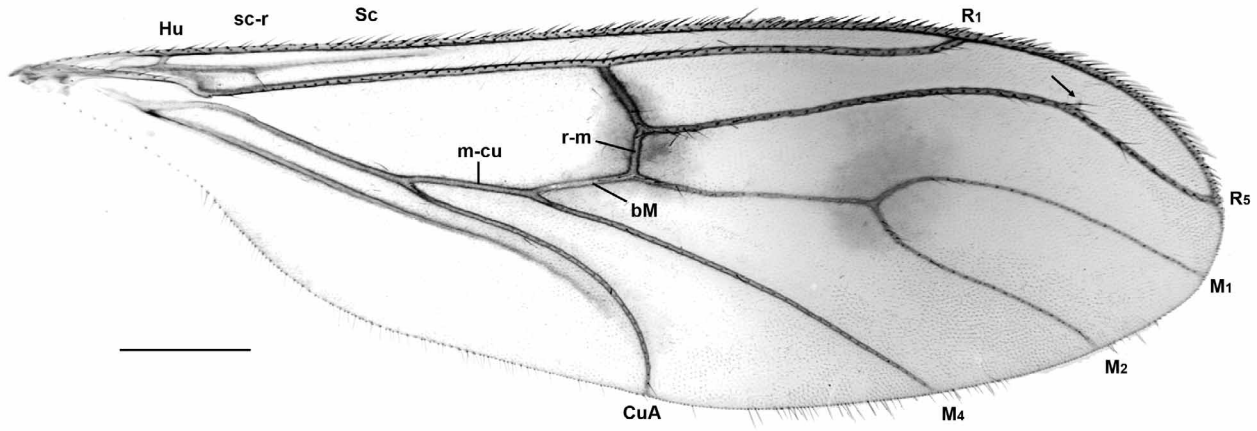


FIGURE 1. *Eratomyia risaralda*, **sp. n.**, female paratype. Wing. An arrow shows a teratological spur on R_5.

Female. Total body length, 4.3–4.5 mm. Wing length, 4.5–4.7 mm. A teratological spur is present in one of the wings of a female paratype (Fig. 1). Abdominal tergites and sternites brown, except for the yellow tergites and sternites 3 and 5. Tergite and sternite 7 well developed. **Terminalia** (Fig. 4). Terminalia brown, cerci yellow. Sternite 8 deeply modified, wide, with a pair of digitiform projections mesally in the anterior margin, with a pair of lateral rows of golden, elongated hairs. Sternite 9 short anteriorly, not Y-shaped. Tergites 9 and 10 short. A broad basal cercomere and a long distal cercomere more than twice the preceding one. Spermathecae not observable in any of the specimens.

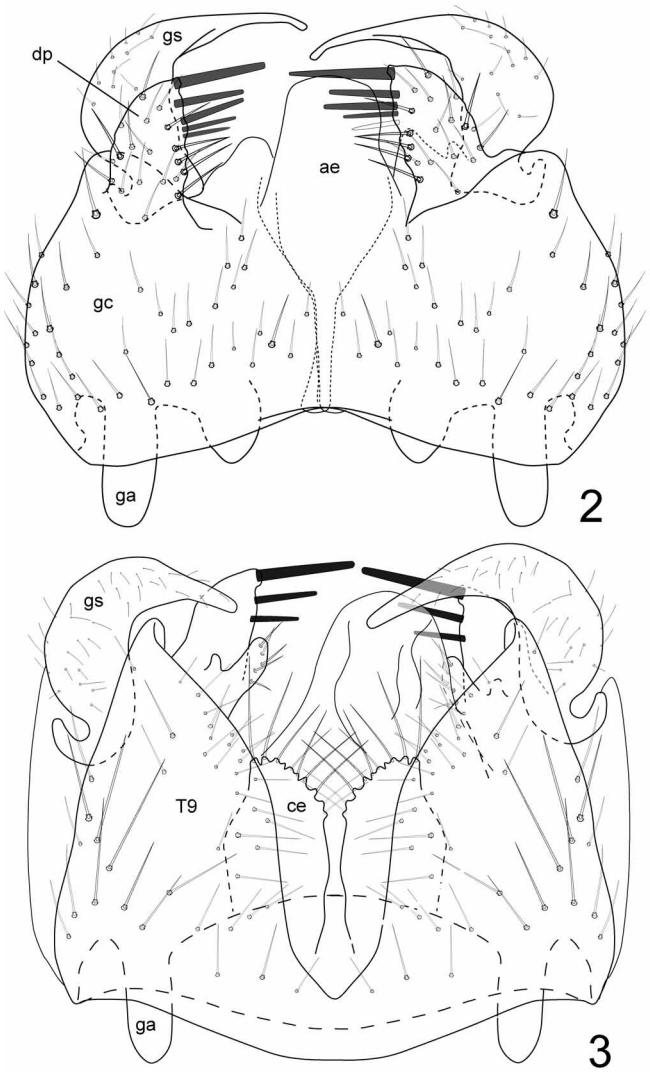
Etymology. The species epithet refers to the type-locality and is a noun in apposition.

Discussion

E. risaralda, **sp. nov.** may be distinguished from the only other species of the genus, *E. magnifica* Amorim & Rindal, by the presence of brownish maculae in the wing membrane and by the yellow tergite 3 in the male and yellow tergites 3 and 5 in the female. In *E. magnifica*, the wing membrane is hyaline and tergites 3 and 5 in the male are yellow. Also the brown area at the base of the hind coxa in *E. magnifica* is much larger than that in *E. risaralda*. The presence of maculae on the wing membrane is to our knowledge unique in the Rangomaramidae, and is quite uncommon in Mycetophiliformia, with scattered examples in most families, as Keroplatidae, Ditomyiidae, and Mycetophilidae.

Features of the male terminalia help to separate the two *Eratomyia* species. The paired distal projections of tergite 9 are more slender in *E. risaralda* (Figs. 2–3; see Amorim & Rindal 2007: fig. 19), a feature also seen in *Chiletricha* and, hence, plesiomorphic in *Eratomyia*. The gonostylus in *E. risaralda* has a wider base

and becomes slender to the apex, while in *E. magnifica* it is apparently of equal width. A small apical tooth on the gonostylus of *E. magnifica* is absent in *E. risaralda*. The spines on the inner projections of the gonocoxite are stronger and more numerous in *E. risaralda* than in *E. magnifica*, while in *E. magnifica* the inner margin of the gonocoxite distally is quite simple.



FIGURES 2–3. *Eratomyia risaralda*, **sp. n.**, holotype. Male terminalia. 2. Ventral view. 3. Dorsal view. Abbreviations: ae, aedeagus; ce, cercus; dp, distal projection of gonocoxite; ga, gonocoxal apodeme; gc, gonocoxite; gs, gonostylus; T9, tergite 9.

Some of the male terminalia features indicated as autapomorphies for *E. magnifica* by Amorim & Rindal (2007) are also seen in *E. risaralda*, indicating that *Eratomyia* is monophyletic. This includes the presence of mesepimeral setae, the relatively short medial fork and a wide basal cell in the wing, and the presence of a pair of inner digitiform projections bearing strong setae at the distal margin of the gonocoxites ventrally in the male terminalia. These features are now considered synapomorphies of the genus. In *E. risaralda* there is a second, short digitiform projection of the gonocoxite, with some setae, whereas in its congener, this projection is absent. A short second projection in the gonocoxite is also present in *Chiletricha spinulosa* Chandler. If these projections are homologous, it would imply that *Chiletricha* is paraphyletic with respect to *Eratomyia*.

The discovery of a new species of *Eratomyia* helps verify relationships among the Chiletrichinae. A long last palpomere is shared by *Eratomyia*, *Chiletricha* and *Insulatricha*. Also, *Chiletricha* and *Eratomyia* share the presence of setae anteriorly on the basisternite and on the postpronotum. A basisternite clearly connected to the proepisternum is seen in other Chiletrichinae genera and is, hence, presumably plesiomorphic at the

level of the genus. The absence of macrotrichia in the wing membrane is shared by *Eratomyia*, *Kenyatricha*, and *Insulatricha*. It is worth noting that all *Chiletricha* species have the membrane covered by macrotrichia.

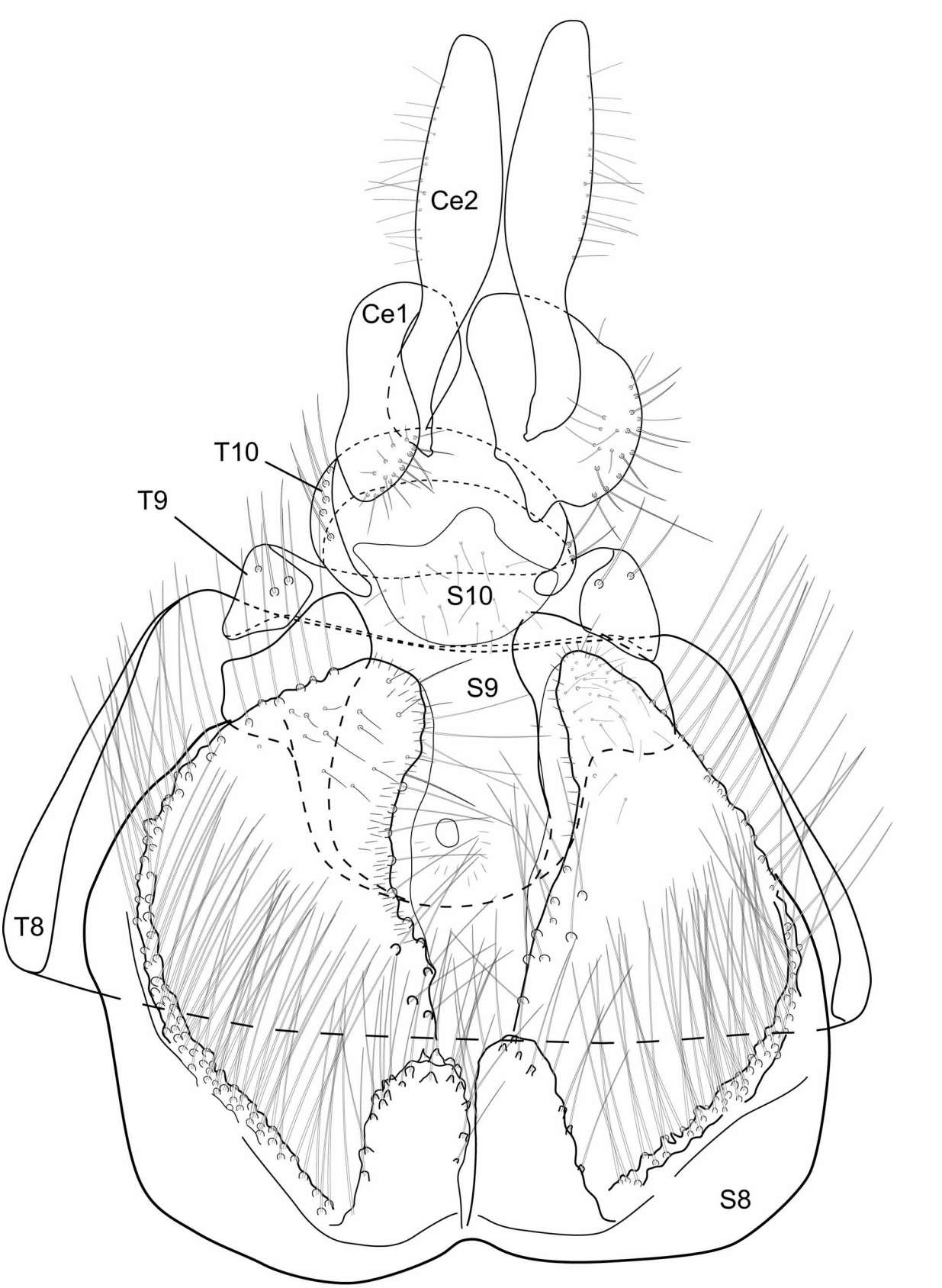


FIGURE 4. *Eratomyia risaralda*, **sp. n.**, paratype. Female terminalia. Abbreviations: ce1, basal cercomere; ce2, distal cercomere ; S8, sternite 8; S9, sternite 9; S10, sternite 10; T8, tergite 8; T9, tergite 9 ; T10, tergite 10.

The features of the female terminalia of *E. risaralda* clearly confirm the phylogenetic affinities of *Eratomyia* with *Chiletricha*. The rather flattened and wide sternite 8, with a pair of mesal projections on the anterior margin, a pair of bands of golden setae laterally on sternite 8, and the broad basal cercomere with a long distal cercomere are apomorphic features shared with *Chiletricha* (see Chandler 2002: figs. 25–26, 29–32, 35). An elongated second cercomere is absent in *Rhynchoheterotricha*, but a very distinctive lateral row of elongated setae on sternite 8 seems to be present in this genus (Hippa & Vilkamaa 2006b: fig. 4A), as well as short tergites 9 and 10. In *Rhynchoheterotricha*, the pair of mesal projections at the anterior margin of the tergite 8 seen in *Eratomyia* and *Chiletricha* appears to be absent. The female terminalia of *Rangomarama* (Jaschhof & Didham 2002: fig. 28) does not exhibit these changes in the shape of sternite 8 and the length and distribution of its setae and is, hence, presumably pleisiomorphic for these traits. This also applies to the genera of Ohakuneinae: *Ohakunea* (e.g., Jaschhof & Hippa 2003: fig. 16), *Colonomyia* (Amorim & Rindal 2007: fig. 202), *Rogambara* (Jaschhof 2005: fig. 14) and *Cabamofa* (Jaschhof 2005: fig. 26).

Female *Heterotricha* have an elongated second cercomere, but sternite 8 is more or less laterally flattened, with no elongate setae along the margins, unlike what is seen in other Chiletrichinae species. If *Heterotricha* is sister to Ohakuneinae, as indicated by Amorim & Rindal (2007), then the elongated distal cercomere in *Heterotricha* would be independently derived. Alternatively, if *Heterotricha* forms a clade with Chiletrichinae, as suggested by Jaschhof & Jaschhof (2008), the elongated second cercomere would be a synapomorphy. Other chiletrichine genera, such as *Insulatricha* (Jaschhof 2004a: fig. 11) and *Anisotricha* (Jaschhof 2004a: fig. 26), do not exhibit these modifications of sternite 8 nor of the cerci. *Nepaletricha* (Hippa *et al.* 2009: fig. 2C) and *Sciarosoma* (Jaschhof *et al.* 2006: figs. 9–10), genera that remained with their positions uncertain in the phylogeny of Amorim & Rindal (2007), also lack these modifications in the female terminalia.

Finally, if the modifications of female sternite 8 in *Rhynchoheterotricha* are homologous to those seen in *Chiletricha* and *Eratomyia*, the relationships within the subfamily Chiletrichinae would be different from what was proposed in Amorim & Rindal (2007). In their phylogeny, *Kenyatricha* and *Insulatricha* are closer to (*Chiletricha* + *Eratomyia*) than *Rhynchoheterotricha*. The female terminalia of *Insulatricha chandleri* Jaschhof does not share the modifications seen in *Chiletricha* and *Eratomyia*, while both described species of *Kenyatricha* are known only from males. If *Rhynchoheterotricha* is sister to (*Kenyatricha* + *Insulatricha* + *Chiletricha* + *Eratomyia*), as indicated in Amorim & Rindal (2007), the shared similarities of the female terminalia with *Rhynchoheterotricha* would not be homologous.

Acknowledgements

The material used in this study was very kindly made available by Michael Sharkey (NSF Grant # DEB-0205982), to whom we are most thankful. This paper is connected to the project supported by FAPESP Grant # 03/10.274–9. The first author has a research fellowship from the Brazilian National Science Research Agency, CNPq, and the second author has a FAPESP graduate fellowship Grant # 07/59466–8. Maria Isabel P.A. Balbi has always been helpful in preparing high quality slide mounts and we are deeply indebted to her continuous support. The paper has benefited from the contribution of three anonymous reviewers to whom we sincerely thank for their careful reading, corrections, and suggestions. This also applies to a careful revision of the manuscript by the editor, Peter H. Kerr.

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